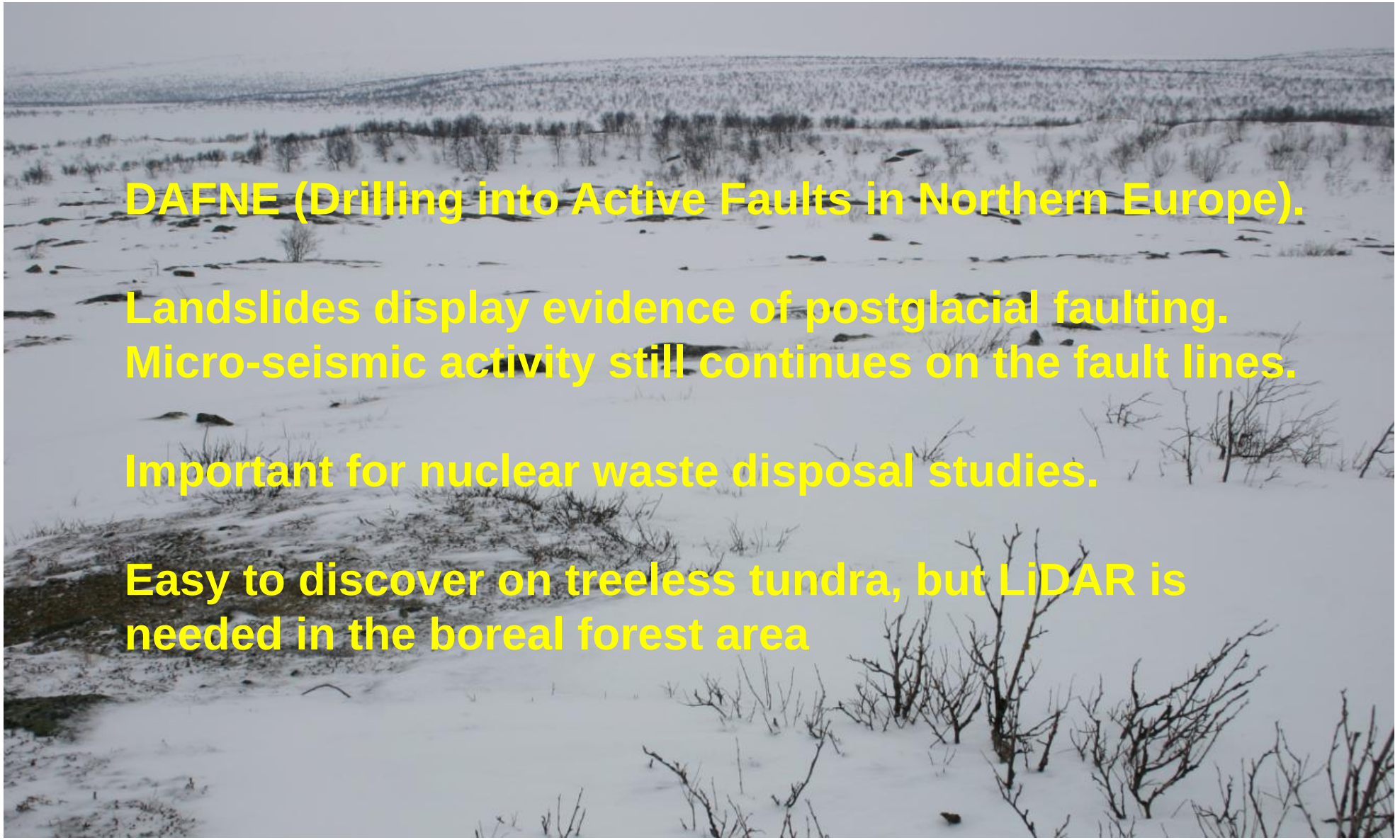
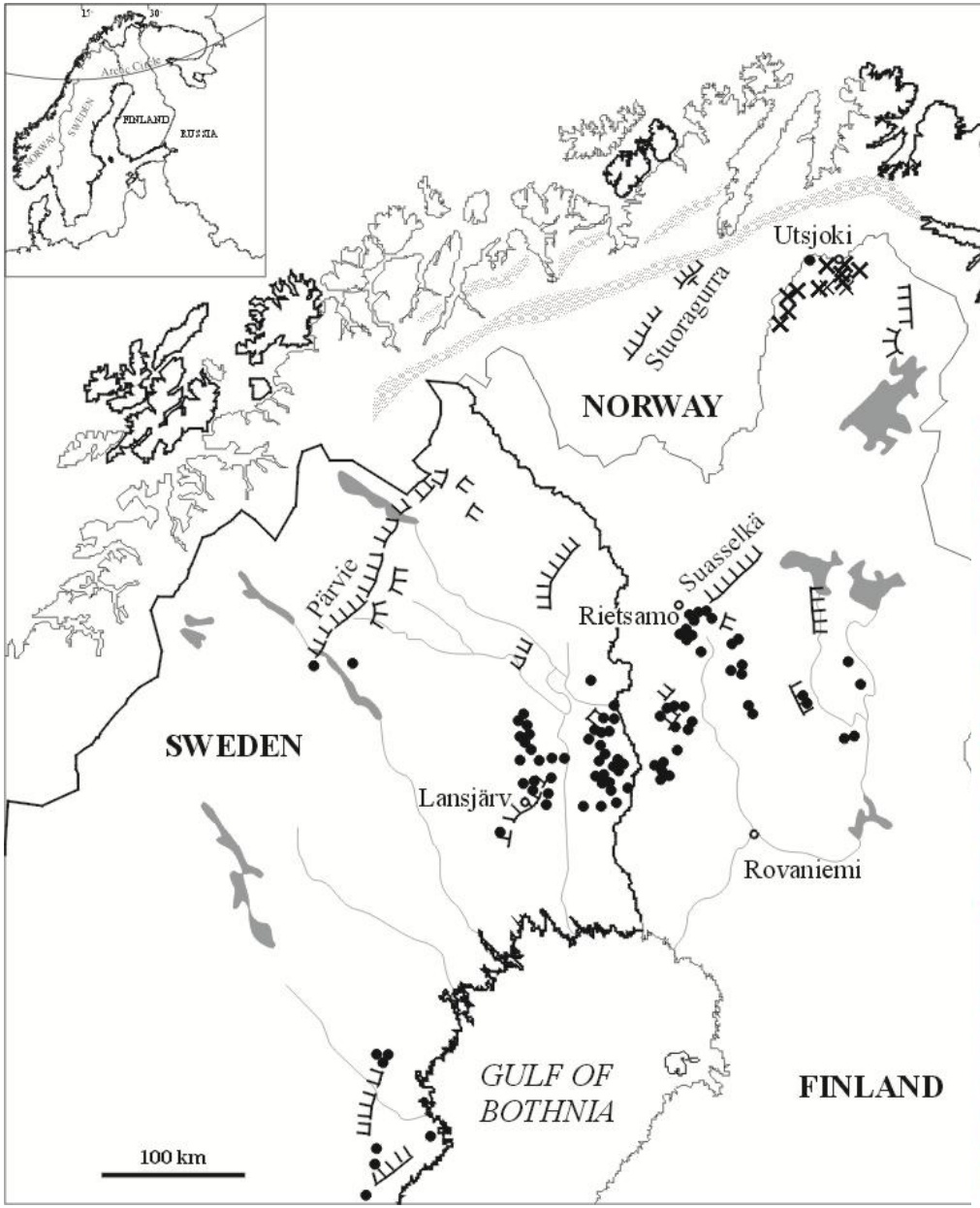
Paleo-landslides in the Suasselkä Fault-zone, Finnish Lapland, derived from LiDAR data

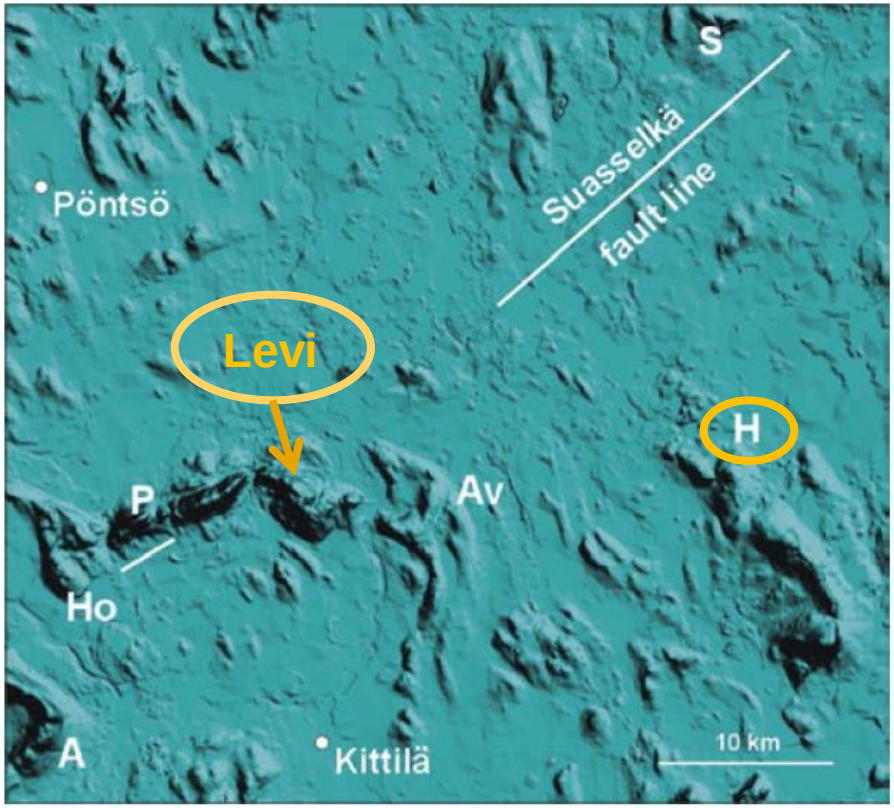
Raimo Sutinen and Eija Hyvönen
Geological Survey of Finland (GTK)

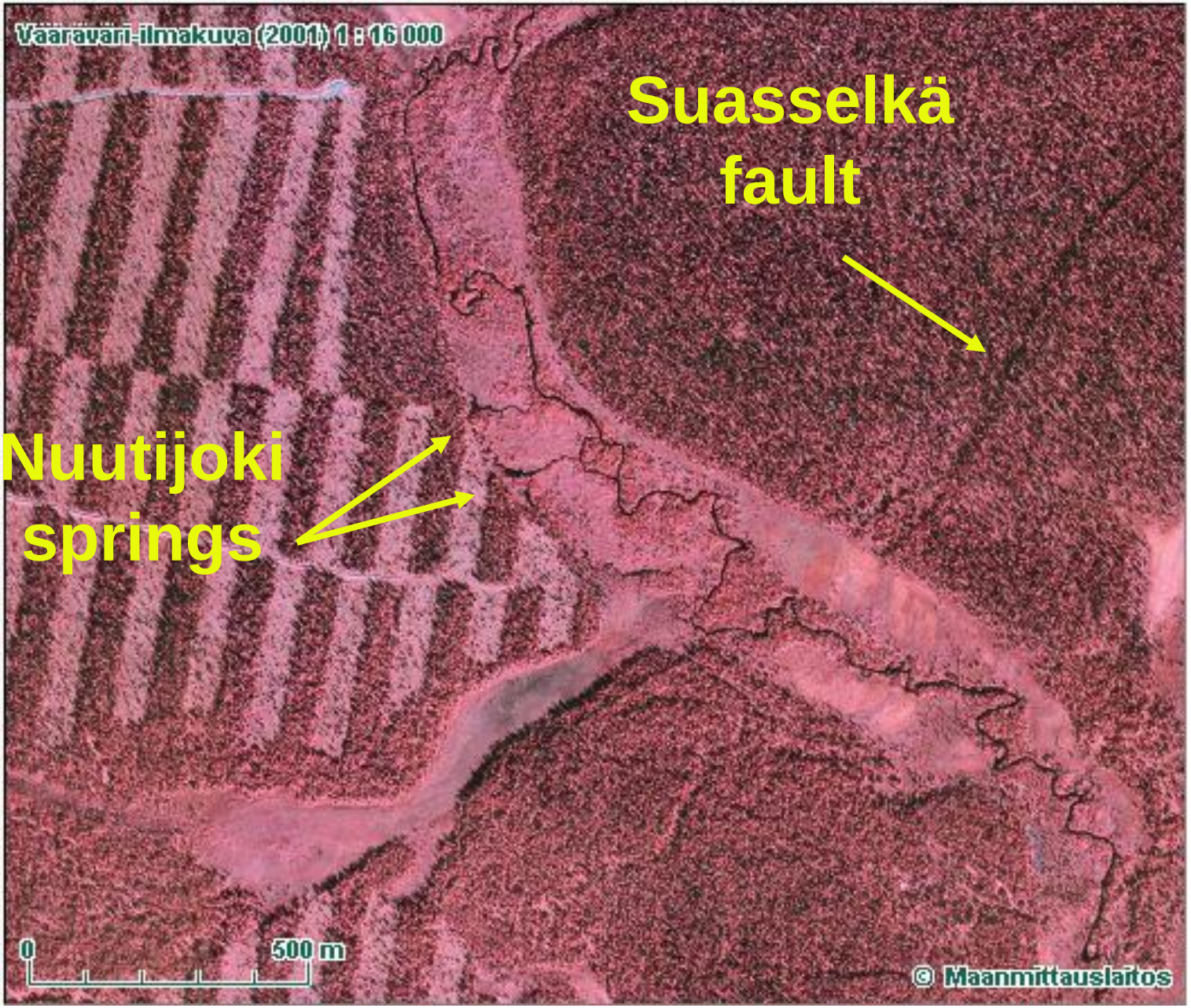

DAFNE (Drilling into Active Faults in Northern Europe).
Landslides display evidence of postglacial faulting.
Micro-seismic activity still continues on the fault lines.
Important for nuclear waste disposal studies.
Easy to discover on treeless tundra, but LiDAR is needed in the boreal forest area

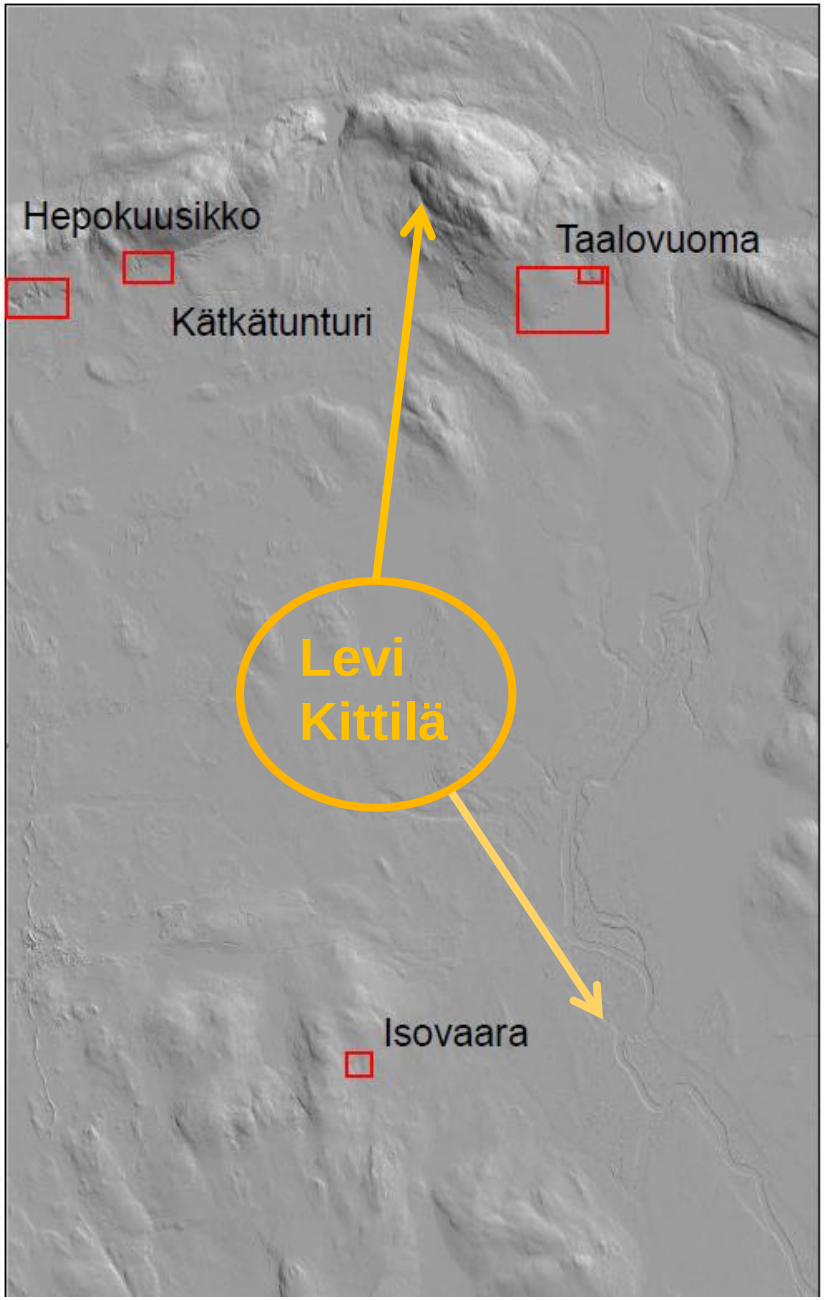


Major faults (Mag 7-8) and paleo-landslides (dots&crosses) in northern Fennoscandia.

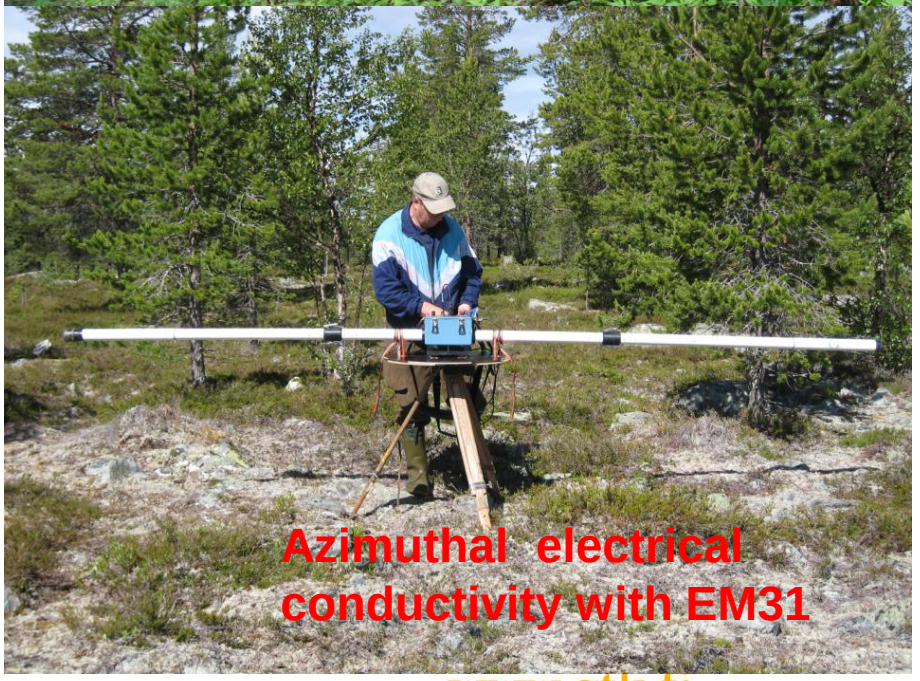
H=Hanhilaki 14C-age 9,730 cal. BP from buried birch remains

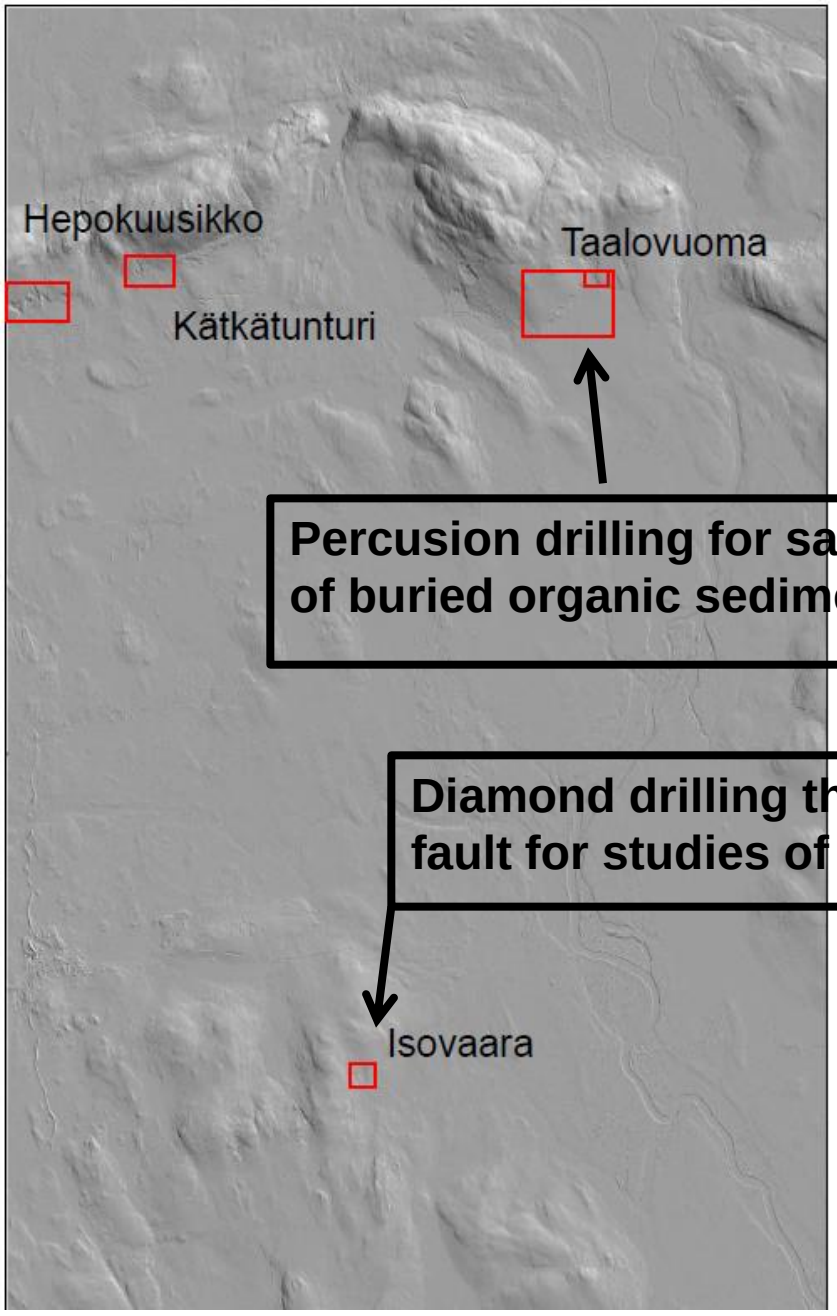



Vaaravaara-ilmakuva (2001) 1 : 16 000
Suasselkä fault
Nuutijoki springs
0
500 m
© Maanmittauslaitos


Hepokuusikko
Taalovuoma
Kätkätunturi
Levi
Kittilä
Isovaara

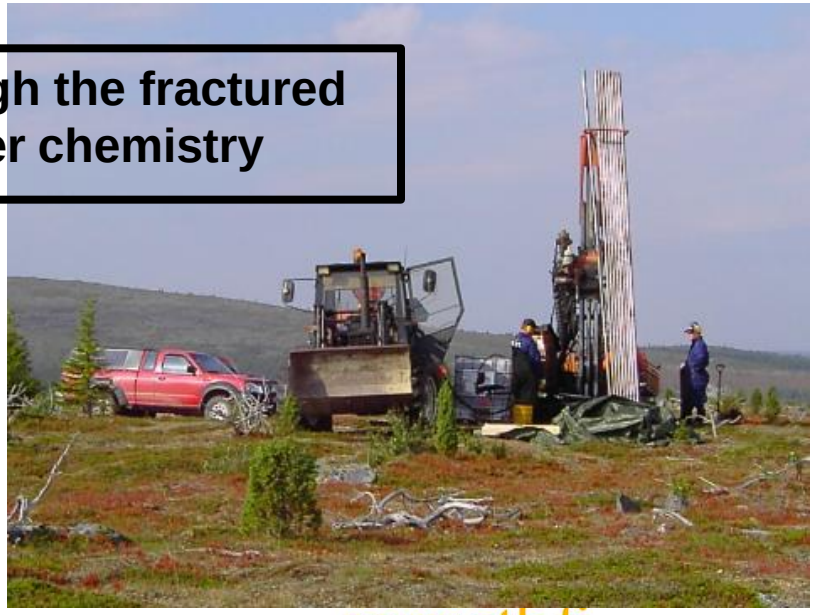

VRS-GPS,
Dielectric ,
Conductivity

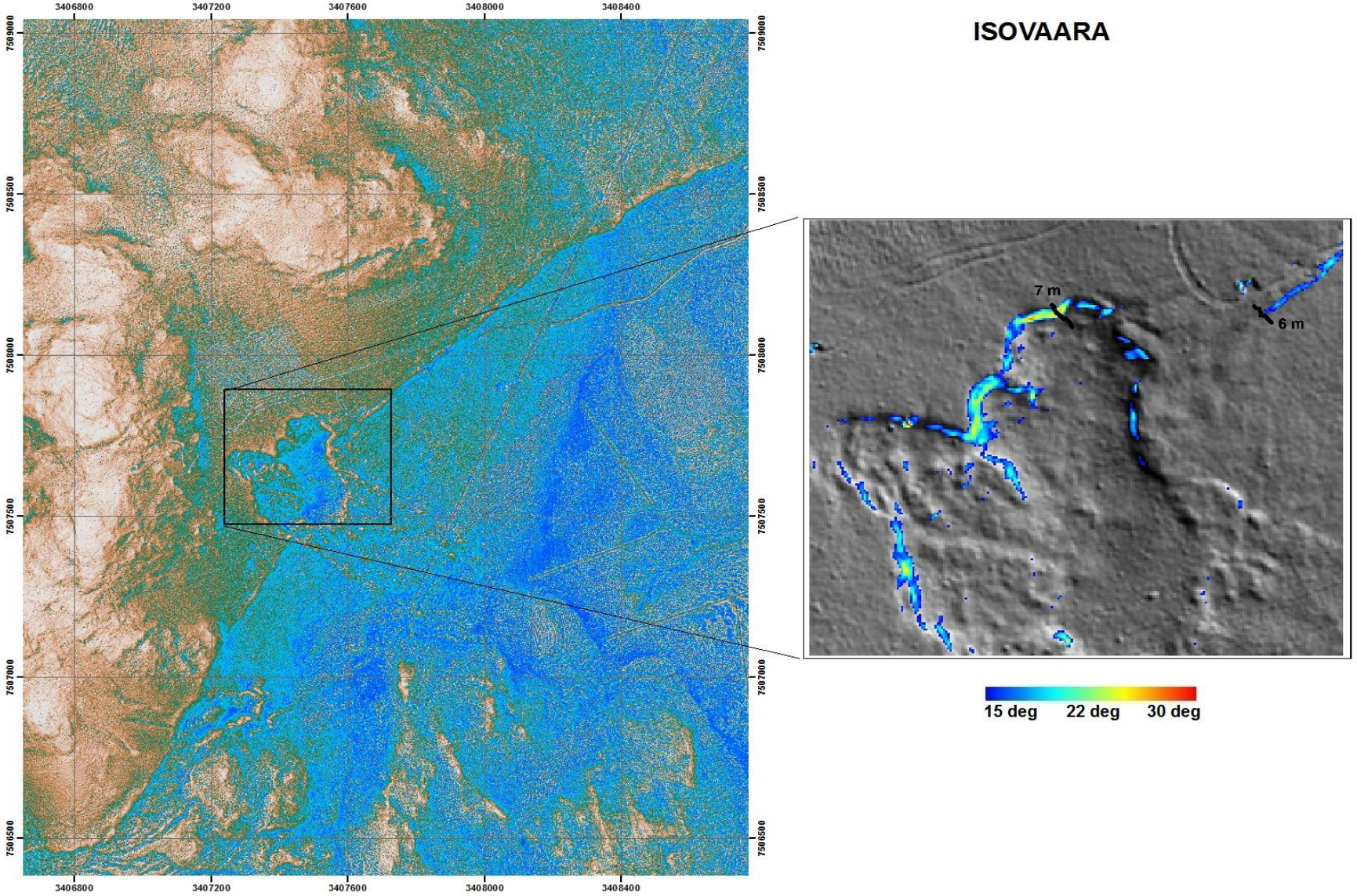

Azimuthal electrical
conductivity with EM31



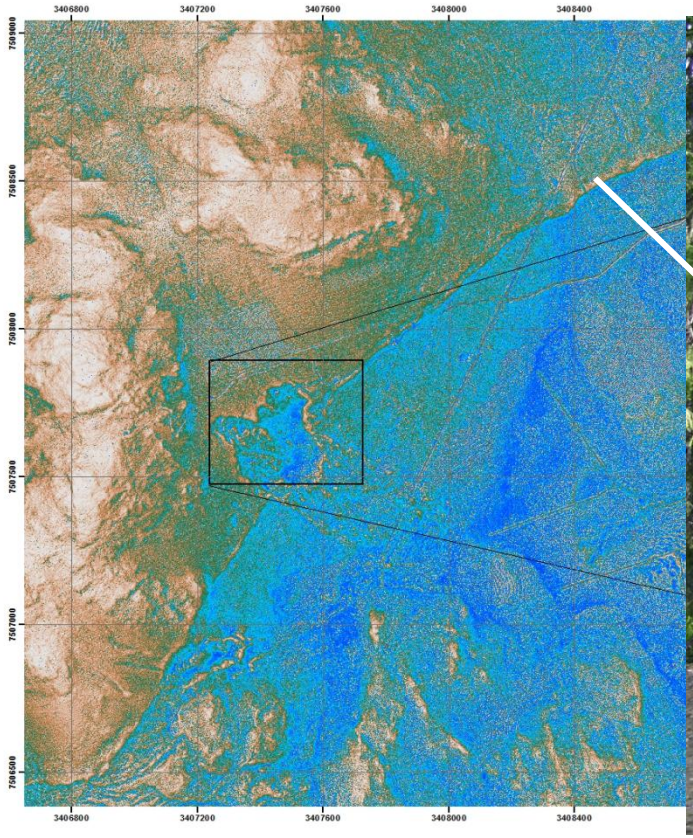
Percusion drilling for sampling of buried organic sediments

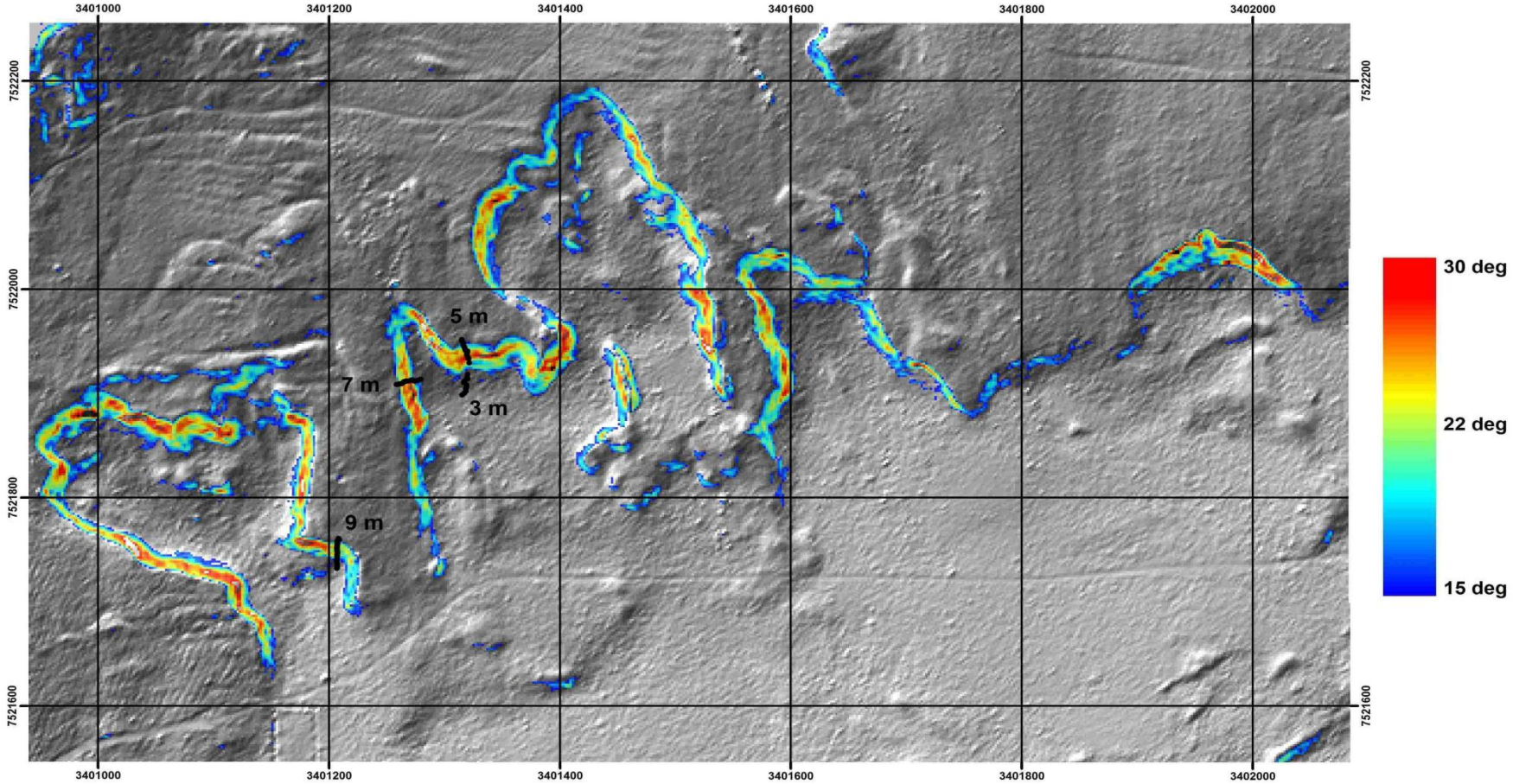
Diamond drilling through the fractured fault for studies of water chemistry



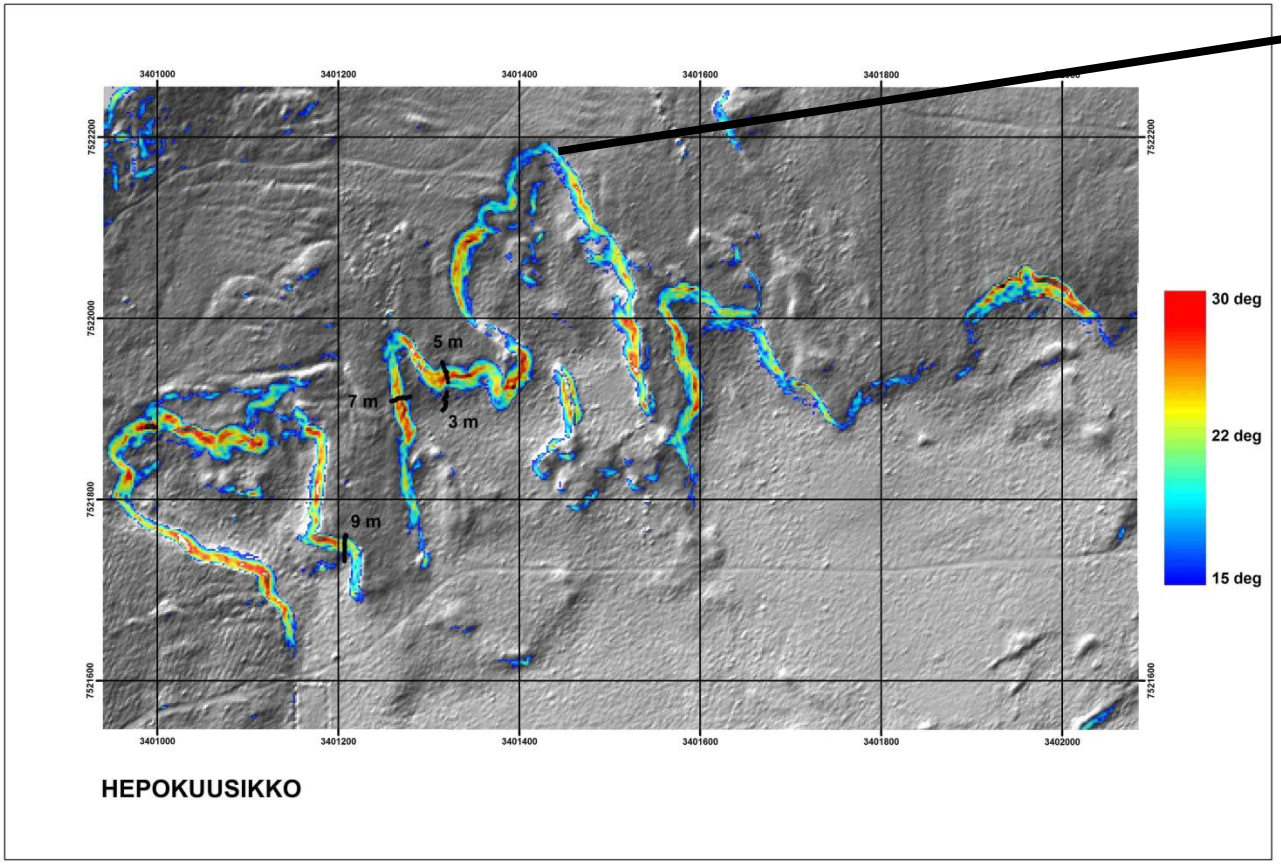

ISOVAARA
3406800
3407200
3407600
3408000
3408400
7509000
7508500
7508000
7507500
7507000
7506500
7 m
6 m
15 deg
22 deg
30 deg

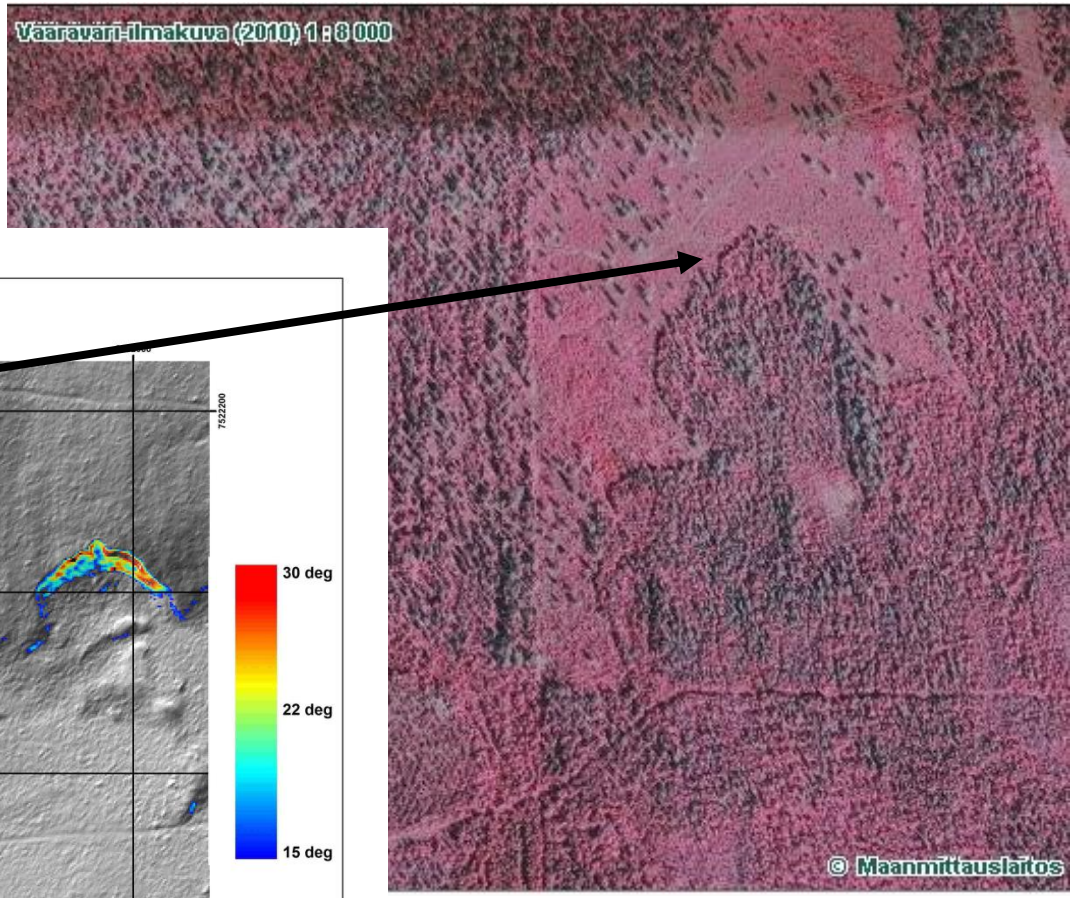
Isovaara (tentatively) postglacial fault

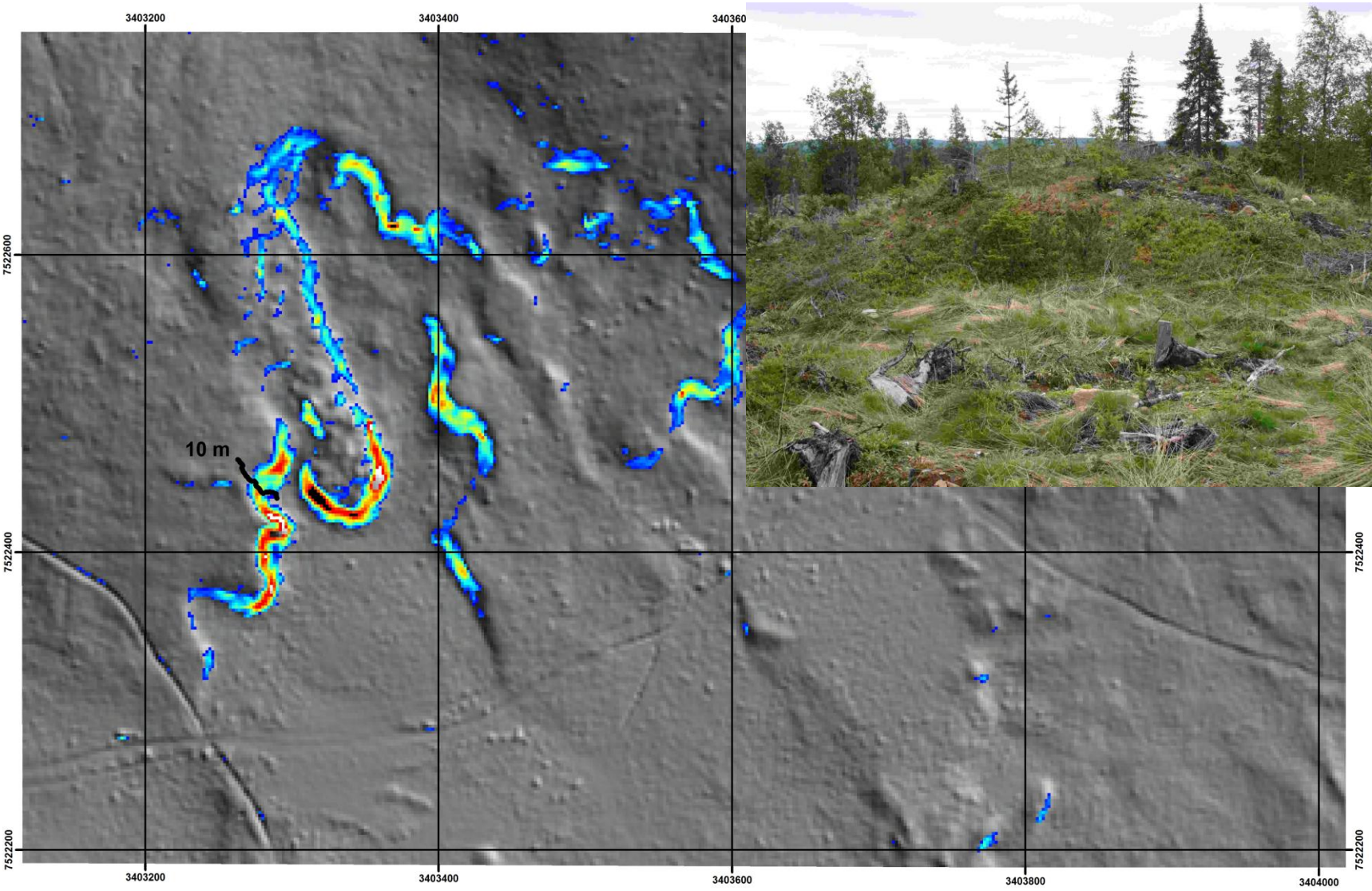




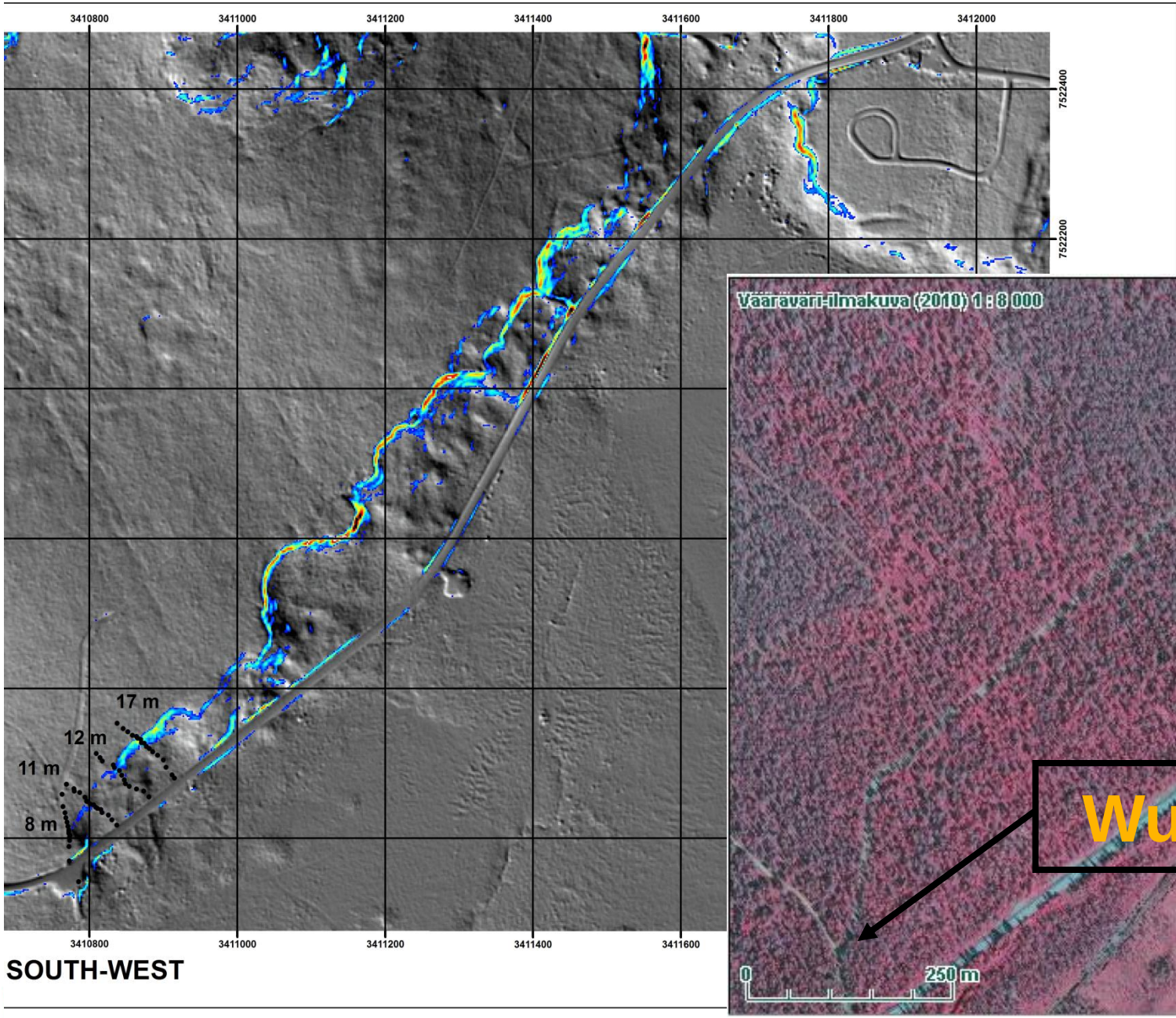
HEPOKUUSIKKO

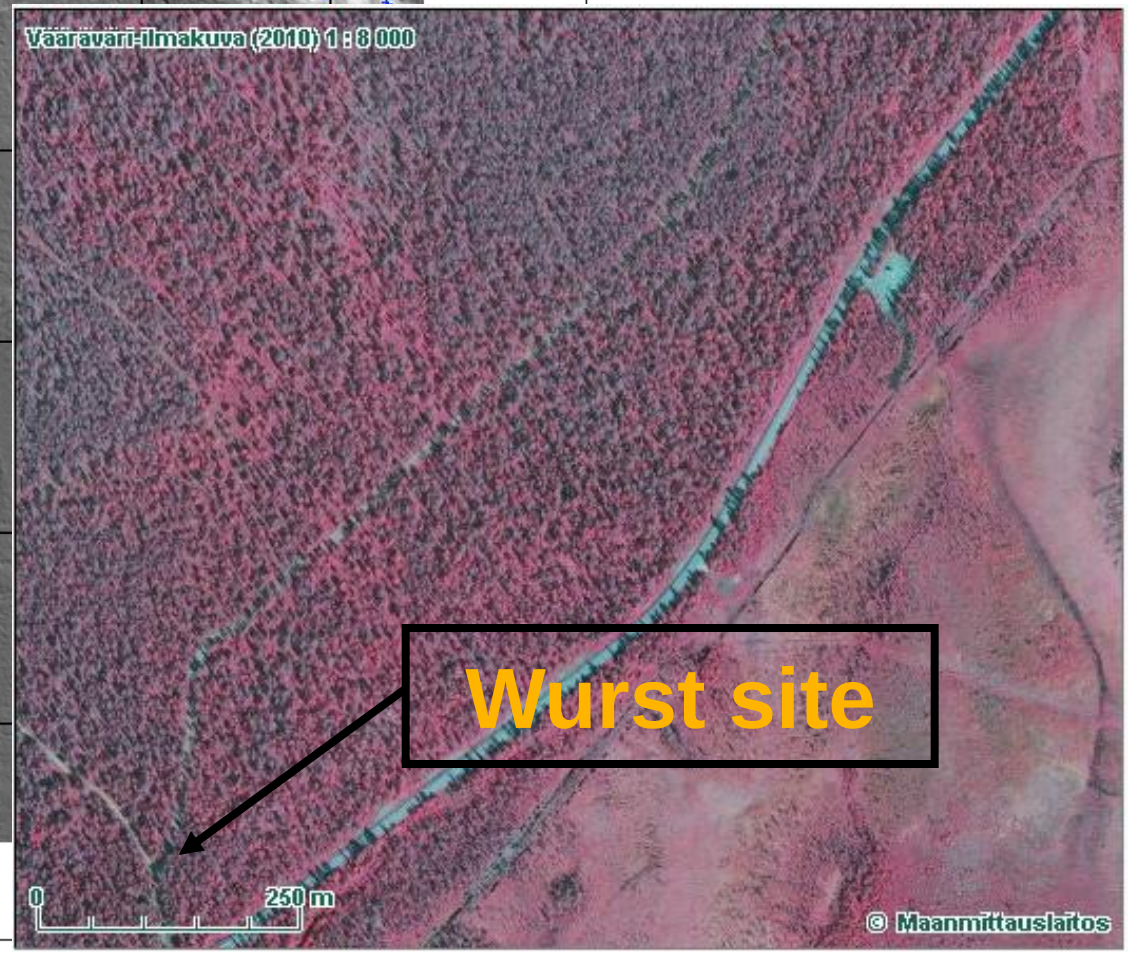

3401000
3401200
3401400
3401600
3401800
3402000
7322200
7322000
7321800
7321600
5 m
7 m
3 m
9 m
30 deg
22 deg
15 deg
HEPOKUUSIKKO


Vaaravari-ilmakuva (2010) 1 : 8 000
© Maanmittauslaitos

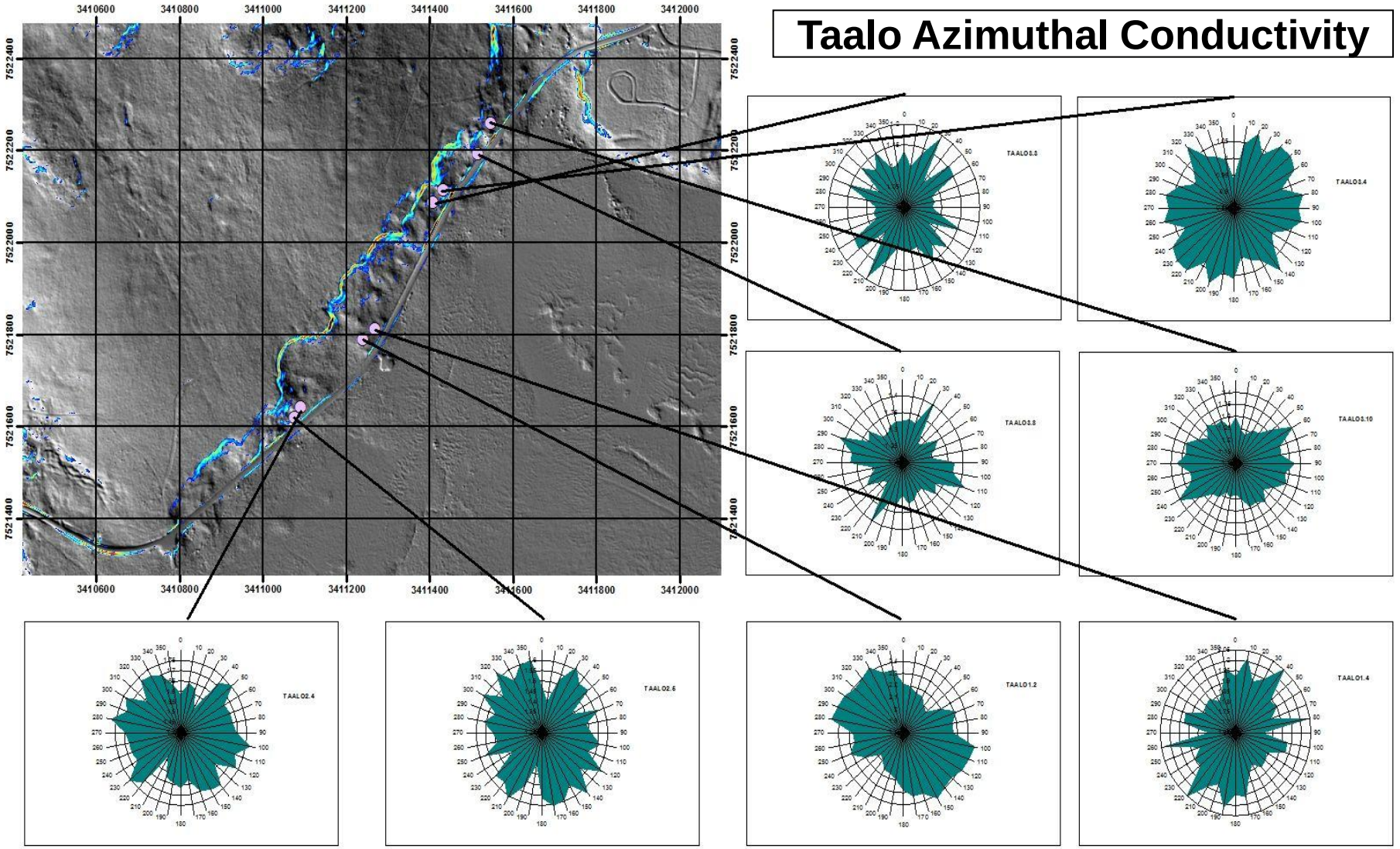


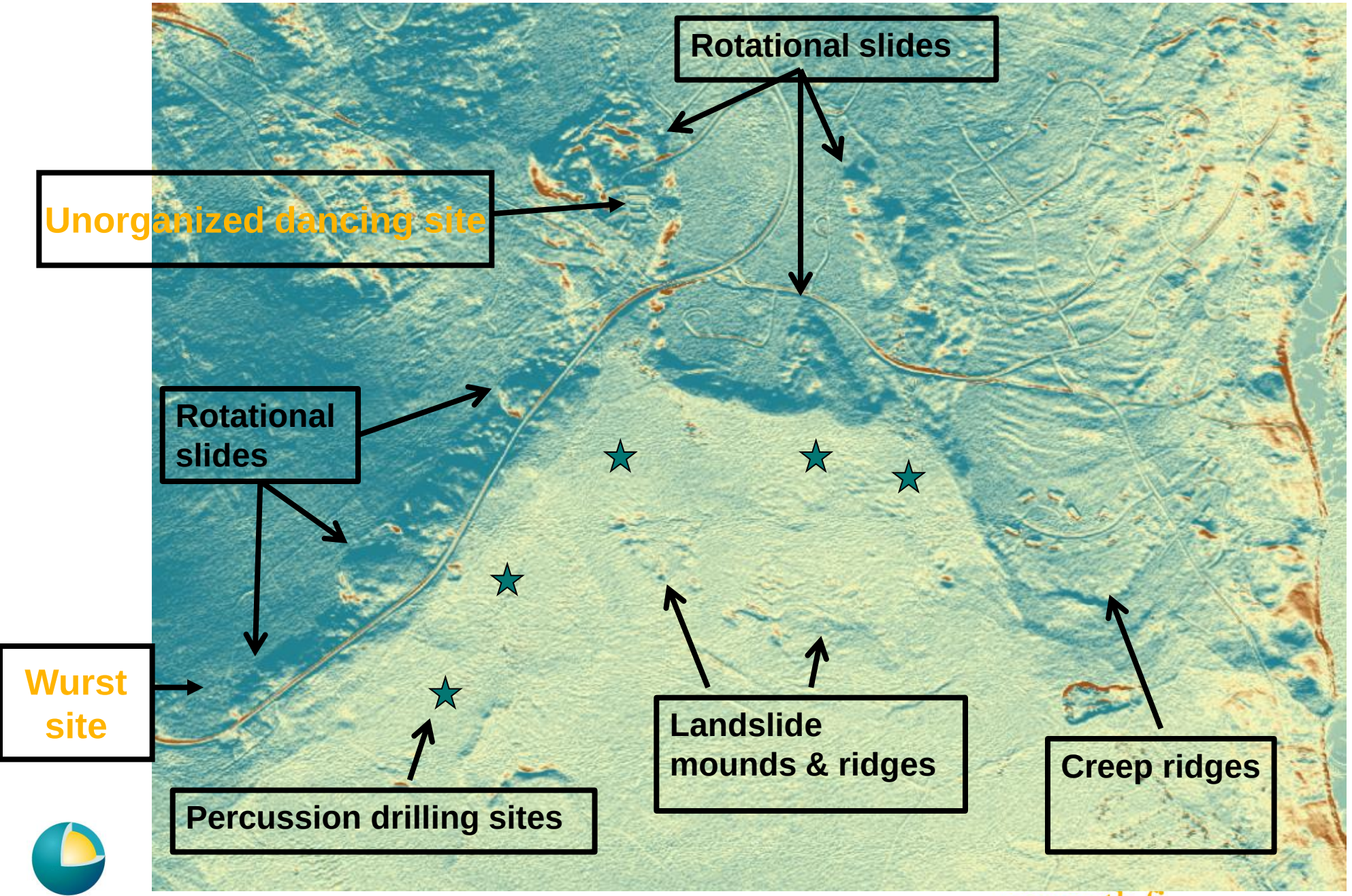
KÄTKÄTUNTURI


3410800
3411000
3411200
3411400
3411600
3411800
3412000
7522400
7522200
17 m
12 m
11 m
8 m
SOUTH-WEST


Vääräväri-ilmakuva (2010) 1 : 8 000
Wurst site
0
250 m
© Maanmittauslaitos

Taalo Azimuthal Conductivity




Rotational slides
Unorganized dancing site
Rotational slides
Wurst site
Percussion drilling sites
Landslide mounds & ridges
Creep ridges

Concluding remarks:

i) Paleo-landslides provide regional evidence of post-glacial fault instabilty.

ii) LiDAR is a verstile tool in mapping of paleo-landslides and post-glacial faults, as well.

iii) As a part of DAFNE, LiDAR fligths over Lapland is an asset in planning of drilling campaign.

Thank you for your attention